What is claimed is:

1 \(\)1. An apparatus for dissipating heat from an electronic device, the apparatus

2 comprising:

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an evaporator thermally connected to the electronic device to receive thermal energy from the electronic device;

a condenser connected to the evaporator;

a coolant cycling between the evaporator where liquid coolant is evaporated to facilitate cooling the electronic device and the condenser where vaporized coolant is condensed into a liquid for subsequent evaporation; and

a heater positioned to supply thermal energy to the coolant such that bubbles form within the coolant to maneuver the coolant into contact with the evaporator.

1 2. The apparatus of claim 1 further comprising a pump to circulate the coolant

2 between the condenser and the evaporator.

1 3. The apparatus of claim 1 further comprising an interface thermally

2 connected to the evaporator to transfer thermal energy from the electronic device to

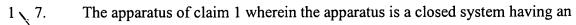
3 the evaporator.

1 4. The apparatus of claim 1 further comprising one or more flexible conduits

connected to the evaporator and the condenser to transport the coolant between the evaporator and the condenser.

1 5. The apparatus of claim 1 wherein the evaporator is a wicked evaporator.

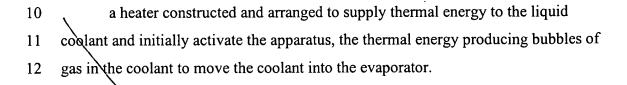
6. The apparatus of claim 1 wherein the heater is/a resistive coil heater.



- interior volume and the liquid coolant initially occupies more than 90 percent of the
- 3 interior volume.

8. The apparatus of claim 7 wherein the closed system comprises only liquid and vapor coolant.

- 9. An integrated circuit cooling system comprising:
- an evaporator thermally coupled to the integrated circuit to receive thermal
- 3 energy from the integrated circuit;
- 4 a conduit to guide a coolant to the evaporator; and
- 5 means to add thermal energy to the coolant such that bubbles form within the
- 6 coolant to maneuver the coolant into contact with the evaporator.
- 1 10. The integrated circuit cooling system of claim 9 wherein at least a portion of
- 2 the conduit is flexible.
- 1 11. The integrated circuit cooling system of claim 9 wherein the means to add
- 2 thermal energy to the coolant is a heater.
- 1 12. An apparatus for removing thermal energy from an electronic device, the
- 2 apparatus comprising:
- an evaporator thermally coupled to the electronic device to receive thermal
- 4 energy from the electronic device;
- 5 a condenser;
- 6 a conduit that provides a closed fluid path between the evaporator and
- 7 condenser;
- 8 a liquid coolant partially filling the fluid path prior to activation of the
- 9 apparatus; and



- 1 13. The apparatus of claim 12 wherein the evaporator, condenser and conduit
- 2 define a closed system having an interior volume such that the liquid coolant
- 3 initially occupies more than 90 percent of the interior volume.
- 1 14. The apparatus of claim 12 wherein at least a portion of the conduit is 2 flexible.
- 1 15. A heat pump having an internal start up mechanism that provides thermal
- 2 energy to a liquid coolant within an electronic device cooling system as operation of
- 3 the cooling system is commenced, the start up mechanism being a heater which
- 4 displaces the liquid coolant by generating bubbles within the liquid coolant until the
- 5 liquid coolant enters an evaporator that removes thermal energy from the electronic
- 6 device by evaporating the liquid coolant.
- 1 16. The heat pump of claim 15 wherein the start up mechanism provides thermal
- 2 energy to the liquid goolant when the electronic device is oriented such that the
- /3 liquid coolant is not initially positioned in the evaporator.

The heat pump of claim 15 further comprising a flexible conduit connected to the evaporator to transport the coolant to the evaporator.

- 18. A computer system comprising:
- 2 a chassis
- an integrated circuit board mounted in the chassis;
- 4 a processor coupled to the integrated circuit board; and



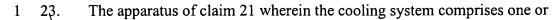
5	a processor cooling system coupled to the processor, the processor cooling
6	system comprising an evaporator to transfer thermal energy from the processor, a
7	coolant and a heater positioned near the liquid coolant to supply thermal energy to
8	the liquid coolant, the thermal energy being supplied to the liquid coolant generating
9	bubbles of gas within the liquid coolant which maneuver the coolant into the
10	evaporator.

- The computer system of claim 18 further comprising a condenser connected 1 19. to the evaporator such that the coolent cycles between the evaporator and the 2 3 condenser.
- The computer system of claim 18 further comprising one or more flexible 20. 1 conduits to transport the coolant between the evaporator and the condenser. 2
 - An apparatus comprising: a cooling system having an evaporator portion and a condenser portion operatively coupled through a closed fluid path having an interior volume;

phase being more than 90% of the interior volume of the closed fluid path; and a mechanism for moving the coolant into the evaporator portion when the apparatus commences operation from a condition where there is no liquid coolant in the evaporator portion, the mechanism being a heater operatively coupled to the cooling system to supply thermal energy to the liquid coolant.

a coolant within the cooling system, the volume of the coolant in the liquid

The apparatus of claim 21 wherein the thermal energy being supplied to the 1 22. liquid coolant by the heater produces bubbles of gas in the liquid coolant to move 2 the liquid coolant into the evaporator portion. 3



- 2 more flexible conduits to transport the coolant between the evaporator and the
- 3 condenser.
- 1 24. A method of cooling an integrated circuit, the method comprising:
- 2 adding thermal energy to a liquid coolant to create bubbles to displace the
- 3 coolant into contact with an evaporator; and
- 4 evaporating the coolant within the evaporator to remove thermal energy from
- 5 the integrated circuit.
- 1 25. The method of claim 24 further comprising condensing the vaporized
- 2 coolant within a condenser before adding thermal energy to the liquid coolant.
- 1 26. The method of claim 24 further comprising pumping the coolant from the
- 2 evaporator to the condenser.
- 1 27. The method of claim 24 further comprising expanding the liquid coolant
- 2 after condensing the coolant.
- 1 28. A kit of parts for an electronic device cooling system, the kit comprising:
- an evaporator adapted to be thermally connected to the electronic device
- 3 such that the evaporator removes thermal energy from the electronic device by
- 4 evaporating a liquid coolant;
- a condenser adapted to be connected to the evaporator such that the
- 6 condenser condenses the coolant that is evaporated by the evaporator; and
- a heater adapted to add thermal energy to the liquid coolant before the liquid
- 8 coolant is evaporated by the evaporator.



- 29. The kit of parts as claimed in claim 28 further comprising a flexible conduit adapted to be coupled to the condenser and the evaporator to guide the coolant between the condenser and the evaporator.
- 30. The kit of parts as claimed in claim 28 further comprising a pump adapted to
- 2 transport the coolant between the evaporator to the condenser.